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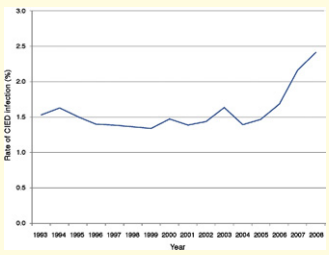
Inside This Issue

STATE-OF-THE-ART PAPER

Despite abundant data on the beneficial effects of implantable cardioverter-defibrillators (ICDs) and cardiac resynchronization therapy (CRT), less is known regarding the safety and complication rates of implantations. van Rees and colleagues systematically reviewed 11 ICD and 7 CRT trials to provide data on the frequency of in-hospital mortality and complications related to the implantation. Average in-hospital mortality was 2.7%, driven primarily by high mortality rates in early post-myocardial infarction trials. The mortality rate was 0.2% in trials utilizing nonthoracotomy ICDs and 0.3% in CRT trials. The pneumothorax rate was similar between the nonthoracotomy ICD and CRT trials (0.9%). Coronary sinus dissection or perforation occurred in 2.0% of CRT patients. Lead dislodgement rates were higher in CRT trials (5.7%) than in nonthoracotomy ICD trials (1.8%).

CLINICAL RESEARCH



Greenspon and colleagues analyzed the rate of infection of cardiac implantable electrophysiologic devices (CIEDs) (i.e., pacemakers and implantable cardioverter-defibrillators) in the United States. The Nationwide Inpatient Sample (NIS) discharge records were queried to determine this rate over time. During the entire study period (1993 to 2008), the incidence of CIED infection was 1.6%. The annual rate of infections remained constant until 2004, when a marked increase was observed, which coincided with an increase in the incidence of major comorbidities and mortality. These results suggest that the increasing use of CIEDs in patients with multiple comorbidities has led to an increase in device-related infections.

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HEART RHYTHM DISORDERS

Higher Rates of Complications and Mortality With Dual-Chamber ICDs 1007

Thomas A. Dewland, Cara N. Pellegrini, Yongfei Wang, Gregory M. Marcus, Edmund Keung, Paul D. Varosy

While dual-chamber implantable cardioverter-defibrillators (ICDs) offer theoretical advantages over single-chamber devices, the clinical superiority of dual-chamber models has not been proven, and they may increase the risk of complications. Dewland and colleagues reviewed data from the National Cardiovascular Data Registry ICD Registry on 100,000 patients who received an ICD. Dual-chamber devices were used in 62%, yet only 40% of these patients had an indication for pacemaker therapy. After adjusting for demographics, medical comorbidities, diagnostic test data, and ICD indication, the odds of any complication (odds ratio [OR]: 1.40) and in-hospital mortality (OR: 1.45) were increased with dual- versus single-chamber ICD devices. Patients who received dual-chamber devices had higher procedure-related complications and in-hospital mortality when compared with single-chamber recipients.

Editorial Comment: Amin Al-Ahmad, James V. Freeman, p. 1014

INTERVENTIONAL CARDIOLOGY

TAVI Safe and Effective With Small Aortic Annulus 1016

Dimitri Kalavrouziotis, Josep Rodés-Cabau, Rodrigo Bagur, Daniel Doyle, Robert De Larochellière, Philippe Pibarot, Eric Dumont

A small aortic annulus increases the risks of surgical repair of severe aortic stenosis (AS), either through patient–prosthesis mismatch or aortic annuloplasty. Kalavrouziotis and colleagues reviewed the valve hemodynamics and clinical outcomes among patients with a small aortic annulus who underwent transcatheter aortic valve implantation (TAVI). A total of 35 patients with severe AS and an aortic annulus diameter <20 mm underwent TAVI. Procedural success was achieved in 97% of patients, with 1 in-hospital death and marked improvements in valve hemodynamics. At a mean follow-up of 14 months, transvalvular gradients remained low, and 30 of the 31 remaining survivors were in New York Heart Association functional class I or II. In high-risk patients with severe AS and a small aortic annulus, TAVI appears to be a reasonable alternative to conventional aortic valve replacement.

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CARDIOVASCULAR RISK

Homocysteine Levels Improve Cardiac Risk Prediction **1025**

Vikas Veeranna, Sandip K. Zalawadiya, Ashutosh Niraj, Jyotiranjan Pradhan, Brian Ference, Robert C. Burack, Sony Jacob, Luis Afonso

Veeranna and colleagues used data from the MESA (Multi-Ethnic Study of Atherosclerosis) dataset and NHANES III (National Health and Nutrition Examination Survey III) to determine if adding homocysteine (Hcy) to a model with traditional cardiovascular disease (CVD) risk factors improves cardiac risk prediction. Hcy (>15 μmol/l) significantly predicted CVD (adjusted hazard ratio [aHR]: 1.79) and coronary heart disease (CHD) events (aHR: 2.22) in MESA, and CVD (aHR: 2.72) and CHD mortality (aHR: 2.61) in NHANES III after adjustments for traditional risk factors and C-reactive protein. Hcy levels led to significant reclassifications in the intermediate-risk population. These results show that Hcy significantly improves risk prediction beyond the Framingham risk score in an ethnically diverse population at intermediate risk for CHD events.

Editorial Comment: Arduino A. Mangoni, Richard J. Woodman, p. 1034

HEART FAILURE

Risks of Cardiac Transplantation After a Cerebrovascular Event **1036**

Vishnu Patlolla, Vanajakshi Mogulla, David DeNofrio, Marvin A. Konstam, Rajan Krishnamani

Symptomatic cerebrovascular disease (sCVD) is considered a relative contraindication to heart transplantation, but has not been well studied. Patlolla and colleagues reviewed data from the United Network for Organ Sharing Registry. There were 1,078 patients with sCVD and 16,765 patients without sCVD who underwent a cardiac transplant. There were higher rates of stroke, death, and functional decline in patients with sCVD than in patients without sCVD, but the risk of death was no longer significant after multivariable adjustment. These results should help programs make informed decisions about patients with sCVD who are being evaluated for heart transplantation.

Editorial Comment: Wayne C. Levy, Todd Dardas, p. 1042

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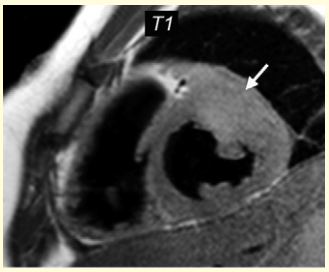
CARDIAC IMAGING

CMR for Evaluation of Pediatric Cardiac Masses 1044



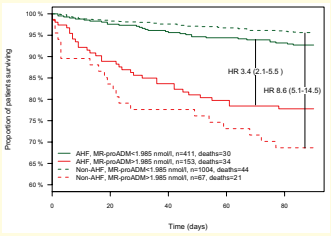
Rebecca S. Beroukhim, Ashwin Prakash, Emanuela R. Valsangiacomo Buechel, Joseph R. Cava, Adam L. Dorfman, Pierluigi Festa, Anthony M. Hlavacek, Tiffanie R. Johnson, Marc S. Keller, Rajesh Krishnamurthy, Nilanjana Misra, Stephane Moniotte, W. James Parks, Andrew J. Powell, Brian D. Soriano, Monvadi B. Srichai, Shi-Joon Yoo, Jing Zhou, Tal Geva

Beroukhim and colleagues developed a set of criteria for the evaluation and diagnosis of cardiac tumors in children and then solicited cases from an international cohort to test the utility of the criteria in patients with a confirmed histologic diagnosis. A total of 78 cases were submitted from 15 centers. Reviewers who were blinded to the histologic diagnoses correctly diagnosed 97% of the cases, but included a differential diagnosis in 42%. Better image quality and a more complete examination were associated with higher diagnostic accuracy. Cardiac magnetic resonance (CMR) can predict the likely tumor type in the majority of children with a cardiac mass, and the imaging characteristics of various tumor types are revealed.

Editorial Comment: Dianna M. E. Bardo, p. 1055

BIOMARKERS

MR-proADM Levels Predict Mortality in Patients Presenting With Acute Dyspnea 1057



Alan Maisel, Christian Mueller, Richard M. Nowak, W. Frank Peacock, Piotr Ponikowski, Martin Mockel, Christopher Hogan, Alan H. B. Wu, Mark Richards, Paul Clopton, Gerasimos S. Filippatos, Salvatore Di Somma, Inder Anand, Leong L. Ng, Lori B. Daniels, Sean-Xavier Neath, Robert Christenson, Mihael Potocki, James McCord, Oliver Hartmann, Nils G. Morgenthaler, Stefan D. Anker

The recently published BACH (Biomarkers in Acute Heart Failure) study demonstrated that midregion proadrenomedullin (MR-proADM) had superior accuracy for predicting 90-day mortality compared with B-type natriuretic peptide (BNP) in patients with acute heart failure (AHF). This study reports on the prognostic utility of MR-proADM in patients presenting with acute shortness of breath. Compared with BNP or troponin, MR-proADM was superior for predicting 90-day all-cause mortality. Serial evaluation of MR-proADM performed in admitted patients provided a significant added value compared with a model with the admission values only. MR-proADM identifies patients with high 90-day mortality and adds prognostic value to natriuretic peptides in patients presenting with acute shortness of breath, irrespective of their final diagnosis.

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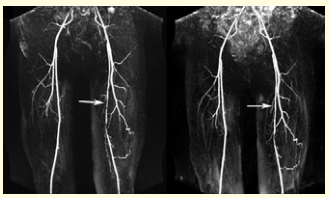
PERIPHERAL VASCULAR DISEASE



Amy M. West, Justin D. Anderson, Frederick H. Epstein, Craig H. Meyer, Hongkun Wang, Klaus D. Hagspiel, Stuart S. Berr, Nancy L. Harthun, Arthur L. Weltman, Joseph M. DiMaria, Jennifer R. Hunter, John M. Christopher, Christopher M. Kramer

West and colleagues hypothesized that low-density lipoprotein (LDL) reduction would improve calf muscle perfusion, energetics, or walking performance in patients with peripheral arterial disease (PAD) as measured by magnetic resonance imaging (MRI) and magnetic resonance spectroscopy (MRS). A total of 68 patients with mild-to-moderate symptomatic PAD were studied at baseline and annually for 2 years after beginning simvastatin 40 mg, simvastatin 40 mg/ezetimibe 10 mg if statin-naïve, or ezetimibe 10 mg if already on a statin. Phosphocreatine recovery time was measured with MRS, calf perfusion was measured using first-pass contrast-enhanced MRI, and 6-min walk distance was recorded. Despite effective LDL reduction, tissue perfusion, metabolism, and exercise parameters did not improve, although rest ankle-brachial index improved. This small, nonplacebo-controlled trial shows that LDL lowering does not improve calf muscle physiology or functional capacity in PAD.

Editorial Comment: Mitchell W. Krucoff, W. Schuyler Jones, Manesh R. Patel, p. 1077